Information Circular 17

1959

Reprinted 1974

GEOLOGY OF A BARITE OCCURRENCE, FULTON COUNTY, PENNSYLVANIA

CATALOGED IN
PA DEP AND DCNR
Central Library
Harrisburg, PA 17105

Arthur A. Socolow

CATALOGED IN
PA Dept of Environmental Resources
Central Library
Harrisburg PA 17101

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

G345/4.10/7 no. 17 1974

Digitized by the Internet Archive
in 2016 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/geologyofbariteo00soco_0

Information Circular 17

GEOLOGY OF A BARITE OCCURRENCE, FULTON COUNTY, PENNSYLVANIA

by Arthur A. Socolow

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES
HARRISBURG
First Printing, 1959
Second Printing, 1974

Reprinted from PROCEEDINGS OF THE PENNSYLVANIA ACADEMY OF SCIENCE,
pages 204-208. Vol. XXXIII, 1959

GEOLOGY OF A BARITE OCCURRENCE, FULTON COUNTY, PENNSYLVANIA*

Arthur A. Socolow

Bureau of Topographic and Geologic Survey, Harrisburg, Pennsylvania

INTRODUCTION

During the summer of 1957 an attempt at commercial development of a barite occurrence, about one mile north of Ft. Littleton, along Little Aughwick Creek in Fulton County (Fig. 1), resulted in a favorable exposure which has permitted a study of the geologic relationships and paragenesis of the mineral occurrence. Several open pits and trenches exposed the mineralized zone underlying the rolling farmland.

The existence of barite in this area was known many years ago. J. J. Stevenson reported in 1882 (p. 304) that mining of barite had been carried on for a year or more, the product having been used as a paint filler. Two deep depressions still mark the locations of old shafts.

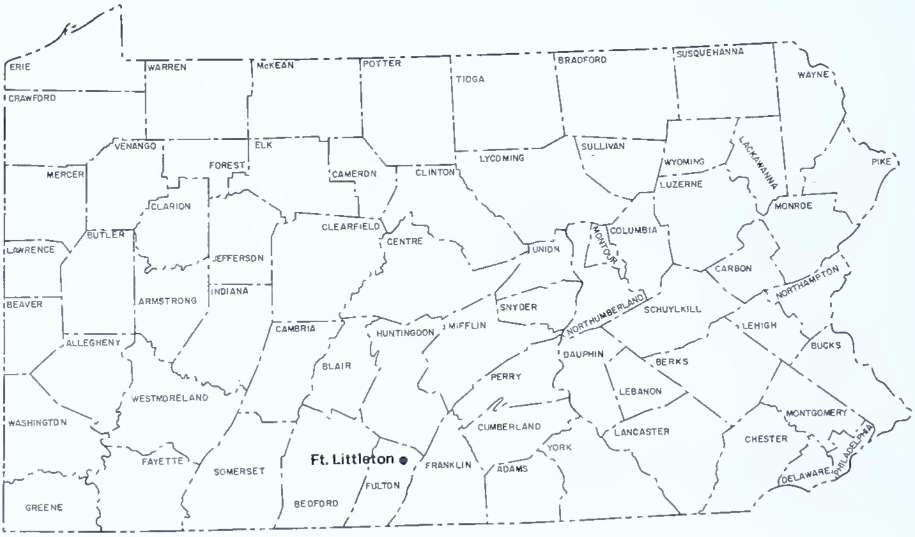

Fig. 1. Map showing location of Ft. Littleton.

STRUCTURE AND STRATIGRAPHY

The Ft. Littleton area lies in the Folded Appalachian Province. The barite mineralization is controlled by a fault which cuts the western flank of a southerly plunging anticline (Fig. 2). The fault is approximately vertical and strikes about N 50° E; this is essentially parallel to the McConnellsburg and Great Cove faults just a few miles to the east.

---

*Published with the permission of the State Geologist, Pennsylvania Geological Survey, Harrisburg, Pennsylvania.

Displacement by the fault is indicated by the offset of a cuestal ridge formed by a sandy member. Slickensides are abundant in material taken from the fault zone. The fault may be traced for nearly 2000 feet, cutting the Wills Creek shale and the Tonoloway and Helderberg limestones. Intense contortion of the shale is more likely due to intraformational folding during the regional deformation than to the effect of the fault itself. The observed fault zone has a width of up to 15 feet and is manifested by in-

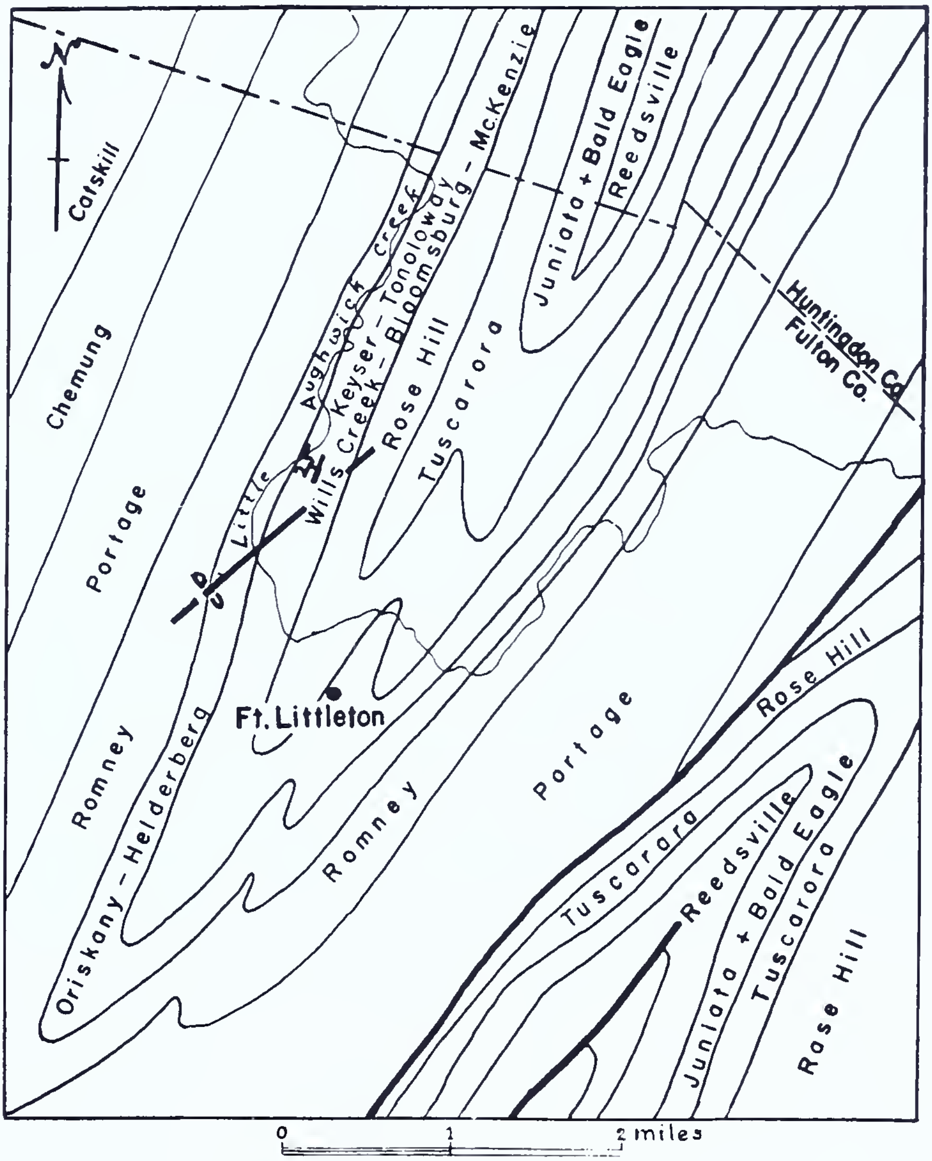

Fig. 2. Geology of the Ft. Littleton area.

tense brecciation, slickensiding, and mineralization. Lesser fracturing extends into the adjacent country rock.

MINERALIZATION AND PARAGENESIS

There were at least two periods of mineralization at the Ft. Littleton barite deposit. The first wave moved along the fault zone and introduced barite, pyrite, and chalcopyrite in that order. This early barite extensively replaced the finely laminated, slightly carbonaceous Tonoloway limestone both in the wall rock and in the breccia fragments within the fault zone. Though some of the limestone is completely replaced, the fine-grained barite shows relict lamination and is discolored by the residual carbonaceous content (Fig. 3).

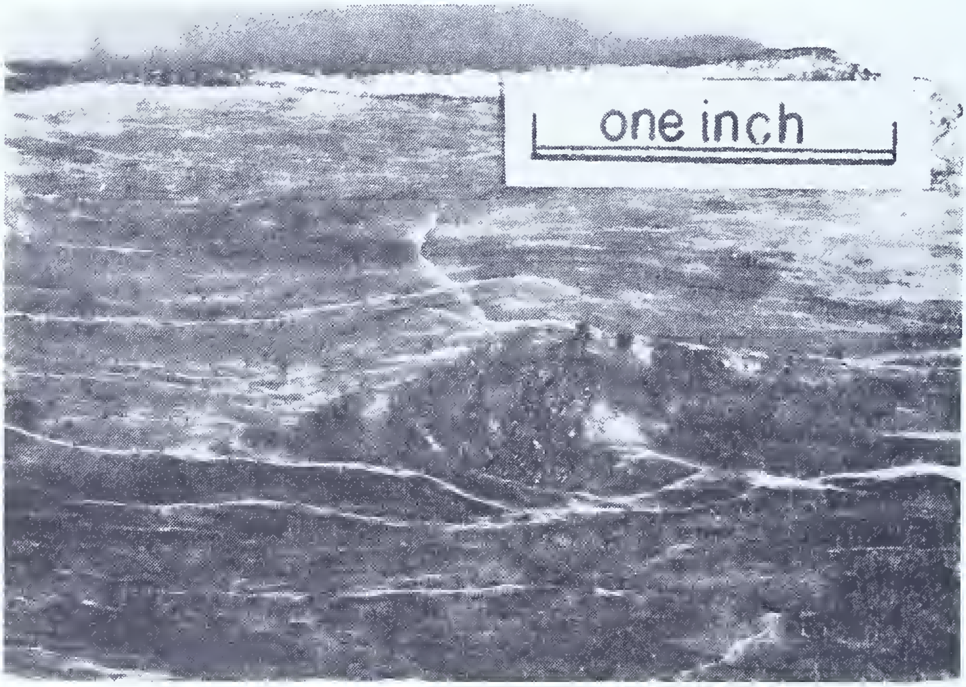

Fig. 3. Barite which has completely replaced limestone but has preserved the sedimentary lamination.

Quartz sand grains and pebbles in one member cut by the fault show partial replacement by fine-grained barite also.

The sulfides constitute less than 0.5 per cent of the introduced minerals; they are found only in association with black, highly carbonaceous fragments of limestone and shale along the fault zone. The carbon probably served as a reducing agent for the sulfide-bearing solution.

Subsequent to the first wave of mineralization, secondary movement occurred along the fault zone, followed in turn by a second wave of barite mineralization. Angular fragments of fine-grained early barite and of limestone and shale may be observed cemented by the later, more coarsely crystalline, nearly pure white barite (Fig. 4).

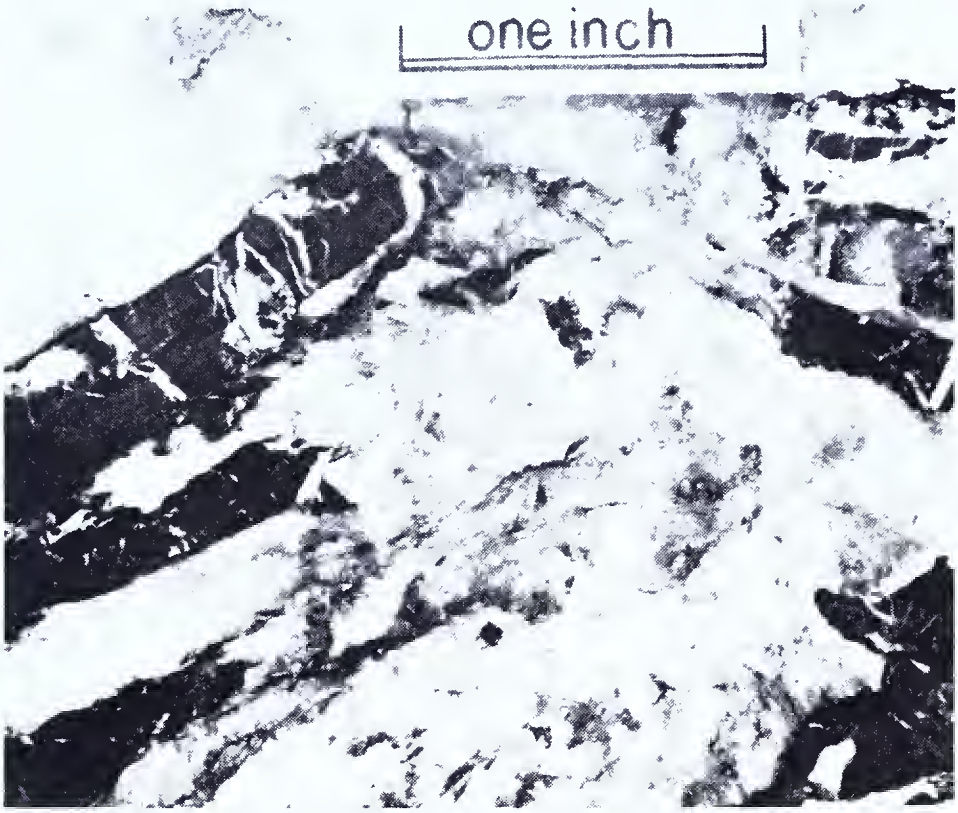

Fig. 4. Late, coarsely crystalline barite cementing breccia fragments of limestone.

During the secondary faulting, gash fractures developed in some of the early barite replacement masses, as well as in the shale and limestone. These secondary fractures are filled by the late, coarsely crystalline, white barite (Fig. 5). No sulfides are found associated with the late barite mineralization.

The mineral assemblage as well as the textural and structural relationships are comparable to those found in regions where hydrothermal origin of the mineralization has been established. This origin is further supported in the Ft. Littleton area by the multiple waves of mineralization along an extensive vertical range and limited lateral range. No sulfides are found in the sediments beyond the area of the fault zone. The extent of replacement by the mineralizing solutions further indicates a degree of chemical disequilibrium and energy characteristic of hydrothermal solutions. While the closest known igneous rock to the Ft. Littleton area is Triassic diabase about 35 miles to the east, effects of mid-Paleozoic and late Paleozoic igneous activity are recognized in many parts of the state

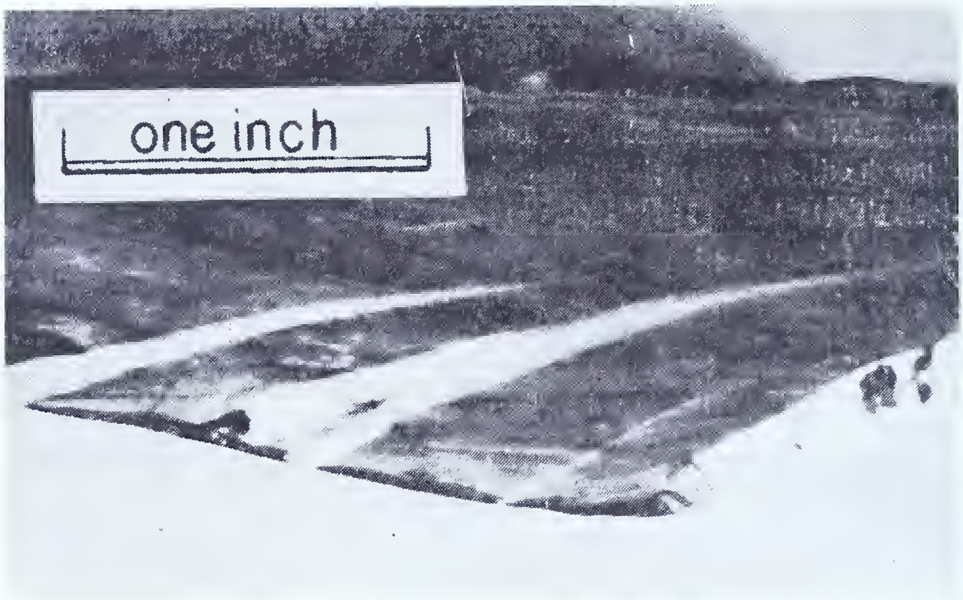

Fig. 5. Late, coarsely crystalline barite filling gash fracture in early barite which has replaced limestone.

and in the Appalachian Province. Fettke (1952) and Lapham have described widespread mid-Devonian bentonite at the Marcellus - Onondaga contact. Paleozoic igneous activity has been recognized further north in New England.

It is entirely feasible that igneous activity of pre-tectonic or syntectonic origin extended under much of the Appalachian trough. The Ft. Littleton barite occurrence may well be a manifestation of such activity, where hydrothermal solutions originated a relatively short distance beneath the observed deposit and rose along a ready channelway via the fault.

LITERATURE CITED

Fettke, C. R. 1952. Tioga bentonite in Pennsylvania and adjacent states. Bull. Amer. Assn. Pet. Geol., 2038-2040.

Lapham, D. M. Unpublished manuscript, Pa. Geol. Survey.

Stevenson, J. J. 1882. Geology of Bradford and Fulton Counties, Second Geological Survey of Pennsylvania, Harrisburg, Pennsylvania.

GRAPHIC ARTS INTERNATIONAL UNION LABEL
G
A
U
UNION